

Listing of Claims:

Claim 1 (Currently Amended) An apparatus comprising:

an integrated circuit (IC) die; and

a thermal mass coupled to the IC die, wherein the thermal mass comprises a stacked microchannel heat exchanger including a plurality of microchannel layers.

Claim 2 (Original) The apparatus of claim 1, wherein the thermal mass is thermally and operatively coupled to the IC die by a layer of solder disposed between the thermal mass and the surface of the IC die.

Claim 3 (Original) The apparatus of claim 2, wherein the layer of solder comprises interstitial solder.

Claim 4 (Original) The apparatus of claim 1, wherein the thermal mass is thermally and operatively coupled to the IC die by an adhesive disposed between the thermal mass and the surface of the IC die.

Claim 5 (Original) The apparatus of claim 4, wherein the adhesive comprises a thermal adhesive.

Claim 6 (Original) The apparatus of claim 4, wherein the adhesive comprises a silicon to silicon bonding adhesive.

Claim 7 (Original) The apparatus of claim 6, wherein the adhesive comprises a polymer compound.

Claim 8 (Original) The apparatus of claim 7, wherein the adhesive comprises bisbenzocyclobutene.

Claim 9 (Original) The apparatus of claim 1, wherein the thermal mass is thermally coupled to the IC die by a thermal interface material (TIM) layer.

Claim 10 (Original) The apparatus of claim 1, further comprising a substrate to which the IC die is flip-bonded.

Claim 11 (Original) The apparatus of claim 10, wherein the thermal mass is operatively coupled to the substrate via a plurality of fasteners.

Claim 12 (Currently Amended) The apparatus of claim 11, further comprising a plurality of standoffs physically coupled to the substrate and to which the plurality of fasteners are physically coupled.

Claim 13 (Original) The apparatus of claim 1, further comprising:

a solderable layer formed on the IC die; wherein the thermal mass is thermally and operatively coupled to IC die by the solderable layer.

Claim 14 (Original) The apparatus of claim 13, wherein the solderable layer is formed from at least one of the following metals: copper (Cu), gold (Au), nickel (Ni), aluminum (Al), titanium (Ti), tantalum (Ta), silver (Ag) and Platinum (Pt).

Claim 15 (Original) The apparatus of claim 13, wherein the solderable layer and the thermal mass are made of substantially similar metals.

Claim 16 (Currently Amended) An apparatus comprising:

an integrated circuit (IC) package, said IC package containing one or more IC dies; and

a thermal mass coupled to the IC package, wherein the thermal mass comprises a stacked microchannel heat exchanger including a plurality of microchannel layers.

Claim 17 (Original) The apparatus of claim 16, wherein the thermal mass is thermally and operatively coupled to the IC die by a layer of solder disposed between the thermal mass and the surface of the IC die.

Claim 18 (Original) The apparatus of claim 17, wherein the layer of solder comprises interstitial solder.

Claim 19 (Original) The apparatus of claim 16, wherein the thermal mass is thermally and operatively coupled to the IC die by an adhesive disposed between the thermal mass and the surface of the IC die.

Claim 20 (Original) The apparatus of claim 19, wherein the adhesive comprises a thermal adhesive.

Claim 21 (Original) The apparatus of claim 19, wherein the adhesive comprises a silicon to silicon bonding adhesive.

Claim 22 (Original) The apparatus of claim 21, wherein the adhesive comprises a polymer compound.

Claim 23 (Original) The apparatus of claim 22, wherein the adhesive comprises bisbenzocyclobutene.

Claim 24 (Original) The apparatus of claim 16, wherein the thermal mass is thermally coupled to the IC die by a thermal interface material (TIM) layer.

Claim 25 (Original) The apparatus of claim 16, further comprising a substrate to which the IC die is flip-bonded.

Claim 26 (Original) The apparatus of claim 25, wherein the thermal mass is operatively coupled to the substrate via a plurality of fasteners.

Claim 27 (Currently Amended) The apparatus of claim 26, further comprising a plurality of standoffs physically coupled to the substrate and to which the plurality of fasteners are physically coupled.

Claim 28 (Original) The apparatus of claim 16, further comprising:
a solderable layer formed on the IC die; wherein the thermal mass is thermally and operatively coupled to IC die by the solderable layer.

Claim 29 (Original) The apparatus of claim 28, wherein the solderable layer is formed from at least one of the following metals: copper (Cu), gold (Au), nickel (Ni), aluminum (Al), titanium (Ti), tantalum (Ta), silver (Ag) and Platinum (Pt).

Claim 30 (Original) The apparatus of claim 28, wherein the solderable layer and the thermal mass are made of substantially similar metals.